

What is claimed is:

- 1 1. A lifting sling, said lifting sling comprising:
2
3 a plurality of core materials; and
4
5 a coating material, said coating material is sprayed onto said plurality of core
6 materials, the thickness of said coating material is regulated in a predetermined
7 pattern to achieve the desired operational properties of said lifting sling.
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- 1 2. The lifting sling in accordance with claim 1, wherein said coating material is selected
2 from the group consisting of a polyurea elastomer, a polyurethane, or a hybrid
3 polyurethane – polyurea elastomer.
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- 1 3. The lifting sling in accordance with claim 2, wherein said coating material has an
2 operational temperature range of –40 to 175 degrees Celsius.
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- 1 4. The lifting sling in accordance with claim 2, wherein said coating material has a tensile
2 strength in the range of up to 6,500 pounds per square inch, an elongation range of up to
3 300 percent, and a tear resistance in the range of up to 600 pounds per linear inch.
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- 1 5. The lifting sling in accordance with claim 1, wherein said coating material includes at
2 least one of the following additives:
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 - 4 i) a catalyst;
 - 5 ii) a stabilizer;
 - 6 iii) a pigment;
 - 7 iv) a fire retardant;

- 8 v) a static electricity reducing additive;
- 9 vi) an ultraviolet filtering additive; or
- 10 vii) a thermal cycling additive.

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1 6. The lifting sling in accordance with claim 1, wherein said plurality of core materials
2 include at least one of the following:

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- 4 i) nylon;
- 5 ii) polyester;
- 6 iii) a synthetic fiber;
- 7 iv) polypropylene;
- 8 v) wire rope;
- 9 vi) steel core;
- 10 vii) cordage rope;
- 11 viii) yarn;
- 12 ix) NOMAX;
- 13 x) KEVLAR; or
- 14 xi) chain.

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1 7. The lifting sling in accordance with claim 1, wherein said lifting sling further
2 comprises a safety core, said safety core being bonded with said plurality of core
3 materials.

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1 8. The lifting sling in accordance with claim 7, wherein said safety core traverses said
2 lifting sling.

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1 9. The lifting sling in accordance with claim 7, wherein said safety core is located, with
2 respect to said plurality of core materials, in at least one of the following locations:

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- 4 i) seam located;
- 5 ii) perimeter located; or
- 6 iii) centrally located.

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1 10. The lifting sling in accordance with claim 7, wherein said safety core is
2 interconnected with at least one of the following:

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- 4 i) an indicator; or
- 5 ii) an electronic system.

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1 11. The lifting sling in accordance with claim 1, wherein prior to applying said coating
2 material said plurality of core materials are selectively temperature adjusted and or pre-
3 tensioned.

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1 12. The lifting sling in accordance with claim 1, wherein a multi-core lifting sling is
2 formed by applying a seaming layer of said coating material to bond together at least one
3 of the following:

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- 5 i) a plurality of said plurality of core materials to form said multi-core
6 lifting sling; or
- 7 ii) a plurality of previously coated said plurality of core materials to form
8 said multi-core lifting sling.

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1 13. The lifting sling in accordance with claim 12, wherein said multi-core lifting sling
2 further comprises a safety core, said safety core utilizes at least one of the following
3 configurations:

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- 5 i) a single said safety core is utilized to traverse each span of said multi-core
6 lifting sling; or
7 ii) a plurality of said safety core are utilized where a unique said safety core
8 traverses each span of said multi-core lifting sling.

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1 14. The lifting sling in accordance with claim 12, wherein said multi-core lifting sling is
2 formed having multiple free moving spans by applying said seaming layer only to the end
3 portions of said multi-core lifting sling.

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1 15. The lifting sling in accordance with claim 14, wherein said multi-core lifting sling has
2 interconnecting ribs.

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1 16. The lifting sling in accordance with claim 1, wherein said lifting sling further
2 comprises at least one of the following:

- 3
4 i) an indicator attached to said lifting sling; or
5 ii) an electronic system attached to said lifting sling.

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1 17. The lifting sling in accordance with claim 16, wherein said electronic system further
2 comprises at least one of the following:

- 3
4 i) a microcontroller;
5 ii) a graphical user interface;
6 iii) a keypad;
7 iv) a touch pad;
8 v) a plurality of general purpose inputs and outputs;
9 vi) a safety core interface;
10 vii) a lifting sling measurement and dynamics interface;

- 11 viii) an RFID interface;
- 12 ix) an IRDA interface;
- 13 x) a transceiver;
- 14 xi) a wireless data link;
- 15 xii) a LAN interface;
- 16 xiii) a WAN interface;
- 17 xiv) a serial data link;
- 18 xv) a GPS interface;
- 19 xvi) a power supply;
- 20 xvii) a flash memory;
- 21 xviii) a read only memory;
- 22 xix) a real time clock;
- 23 xx) an EEROM; or
- 24 xxi) a NOVRAM.

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1 18. The lifting sling in accordance with claim 17, wherein said safety core interface is
2 interconnected with a safety core, said electronic system based in part on monitoring said
3 safety core indicates operational condition, and or suitability for use of said lifting sling.

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1 19. A method of manufacturing a lifting sling, said method comprising the steps of:

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3 a) aligning a plurality of core materials;

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5 b) preparing said plurality of core materials for coating; and

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7 c) applying a coating material to said plurality of core materials, the
8 thickness of said coating material is regulated in a predetermined

9 pattern to achieve the desired operational properties of said lifting
10 sling.

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1 20. The method in accordance with claim 19, wherein said coating material is selected
2 from the group consisting of a polyurea elastomer, a polyurethane, or a hybrid
3 polyurethane – polyurea elastomer.

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1 21. The method in accordance with claim 19, wherein preparing in step 'b' further
2 comprises at least one of the following steps:

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4 a) pre-tensioning selectively said plurality of core materials;

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6 b) adjusting selectively the temperature of said plurality of core
7 materials; or

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9 c) pre-treating selectively said plurality of core materials.

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1 22. The method in accordance with claim 19, wherein said method further comprises at
2 least one of the following steps:

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4 a) positioning a safety core in proximity to said plurality of core
5 materials;

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7 b) bonding said safety core to said plurality of core material;

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9 c) interconnecting said safety core with an indicator or an electronic
10 system;

- d) fastening said indicator or said electronic system to said lifting sling;
- e) forming a multi-core lifting sling by applying a seaming coat of said coating material to bond together at least one of the following:
 - i) a plurality of said plurality of core materials; or
 - ii) a plurality of previously coated said plurality of core materials;
- f) forming interconnected ribs between the core members of said multi-core lifting sling;
- g) positioning a cover around said lifting sling;
- h) molding said cover to said lifting sling;
- i) repairing damage to said coating material by applying an additional layer of said coating material to the damaged area;
- j) fastening an identification tag to said lifting sling; or
- k) applying an additional layer of said coating material, said additional layer having a differing pigment then the previous layer of said coating material.

23. A method of determining the operational condition, and or suitability for use of a lifting sling, said method comprising the steps of:

- 4 a) placing said lifting sling in use, said lifting sling having a safety
5 core, said safety core is bonded by a coating material to said
6 lifting sling plurality of core materials, and said safety core is
7 interconnected with an indicator, or an electronic system, said
8 indicator, or said electronic system is fastened to said lifting
9 sling;
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11 b) allowing said safety core to be subjected to similar use
12 conditions as encountered by said lifting sling;
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14 c) monitoring by way of said indicator, or said electronic system a
15 plurality of operational parameters related to said safety core;
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17 d) determining the operational condition, and or suitability for use
18 of said lifting sling based in part on the monitoring in step 'c';
19 and
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21 e) indicating said lifting sling operational condition, and or
22 suitability for use by way of said indicator, or said electronic
23 system.
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1 24. The method in accordance with claim 22, wherein said plurality of operational
2 parameters includes at least one of the following:
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- 4 i) temperature;
5 ii) pressure;
6 iii) optical transmissions;
7 iv) electrical transmissions;

- 8 v) chemical;
- 9 vi) volume; or
- 10 vii) conductivity.
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